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ABSTRACT

This paper describes a Web-based mentor network designed to pair students in rural independent schools with undergraduates at selected liberal arts colleges. It is one of nine central program elements that constitute the Proteus(TM) system, a multimedia technologies architecture that supports distributed collaborations and work undertaken in the Small Schools Collaborative, a group of small independent schools. Following the introduction, a vignette illustrates how students would work and interact using the system. Part 1 identifies the similarities between learning communities created through computer-supported distance learning and in traditional educational settings; finds that the Proteus(TM) architecture supports the formation of dialogical communities associated with effective learning environments; and notes that the shared work spaces, archival and research capacities, e-mail, video conferencing, publishing, and portfolio management capabilities of the Proteus(TM) system provide strong infrastructure support to learning communities. Part 2 reviews research findings into the effectiveness of college students mentoring adolescents. Part 3 lays out a plan for how mentoring might be understood and undertaken sharing the core values of the Proteus(TM) system--that it be constructivist and in keeping with the learning principles of Project Zero, the Harvard Graduate School of Education research center. (Contains 26 references.) (TD)

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Design Considerations in Developing a Web-Based Mentor Network

Todd Sumner

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A project undertaken as part of the Joseph and Esther A. Klingenstein Fellows Program and submitted to Teachers College in partial fulfillment of requirements for the M.A. degree in Educational Administration.
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My deepest intellectual and conceptual debt is to another Charlemont colleague, Jeff Kelley, the innovative and thoughtful educator behind Proteus™. Without his vision,

advice, and generous support much of what follows might never have occurred to me. Accordingly, this paper is dedicated to him.

Introduction

I set out in September to design a mentoring program for students in rural independent schools like The Academy at Charlemont, the school from which I am on sabbatical leave. The program would pair students, via electronic networks, with undergraduates at selected liberal arts colleges. My rationale in proposing such a plan included these projected benefits:

- The program would expand significantly the range of options available to students wanting to collaborate on a project.
- The program would help reduce the feeling of isolation that comes with studying at a small rural school.
- The program would help break down the psychological barriers between high school and college; it would establish a collaborative relationship between the two levels.
- The program would give students an opportunity to learn things about collegiate life—about expectations and options and subtle differences—that they cannot learn from the guidebooks and admissions office propaganda.

My task was to survey the literature and see if there were any basis in the research that would support these hypotheses.

Because my project has from the outset been site-specific, I have continued throughout the year to consult with my headmaster, Eric Grinnell, and two colleagues—Jeff Kelley and Doug Telling—all of whom were fellow participants last year in the drafting of a proposal to build a classroom in cyberspace. Proteus™ is a collaborative

technologies architecture to support distributed collaborations and work undertaken by the Small Schools Collaborative, a group of small independent schools like Charlemont. The Proteus™ Collaboration Server will provide community infrastructure for learning, a digital meeting/work place, and will serve as an information resource and repository. Community support architecture will include collaboration tools such as videoconferencing, email, shared work spaces, publishing centers, and portfolio management capabilities[1].

My project, then, is an investigation into what a Web-based mentor network might look like. Such a network would be one of the nine central program elements that constitute this distributed collaborative learning community. I have not concerned myself overmuch with technical requirements because the mentoring network is embedded in this larger program; it's one option among many for the students using the Proteus™ network. However, because it is embedded in a larger program, the mentoring network's core values have to be consistent with those of the larger program. Key among those values are that projects undertaken be constructivist and consistent with the learning principles of Project Zero, the research center at Harvard's Graduate School of Education co-directed by David Perkins[2].

I found it helpful when writing this paper to begin with a discussion of distance learning; doing so allowed me to identify at the outset the similarities between computer-supported, geographically diffuse learning communities created through Proteus™ and

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[1] A copy of the proposal for the first project to be run on Proteus™, "The Holocaust as Living History Program," is included as Appendix A. See especially the Abstract (pg. 2) of this document and the graphic representation (on pg. 3) of the Proteus™ community.

[2] Projects should also be consistent with the learning and collaboration principles of the Coalition for Essential Schools. The two sets of principles are complementary (see pgs. 5-6 of Appendix A), and rather than tease out subtle differences in emphasis and address them separately, I will address the Project Zero

more "traditional" educational settings. In the second part of my paper, I review findings from a number of studies that investigate the effectiveness of college students who engage with younger students as tutors or mentors. Building on these findings, I lay out in the third section of my paper a plan for how mentoring might be understood and undertaken in a constructivist, Project Zero-based, distance learning environment. In the paper's final section I review and summarize the results of my investigation.

Colleagues who read of early drafts of this paper suggested that I include a "slice of life" narrative to help make concrete the way students would work and interact using Proteus™. Their suggestion gave rise to "Lucy's Dilemma," which I hope does, in fact, give the reader a sense of the possibilities for powerful learning that the Small Schools Collaborative is trying to create through Proteus™.

Key Ideas

- mentoring network part of Proteus™ infrastructure and must be consistent with values of the larger program
- relevant concepts include distance education, constructivism, mentoring models, and the Project Zero learning and collaboration principles

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principles in this paper. Doing so preserves the spirit in which these two organizations were evoked by Proteus™ planners, who saw them as concise articulations of a pedagogy of understanding.

Lucy's Dilemma

Lucy is a junior at a small independent school in the Berkshires. There are ten other juniors and fewer than a hundred students in the whole school. Some days she wishes she had gone to a bigger school, but then there are days when she is thankful she didn't. Like most young people her age, Lucy has started thinking about college and about the whole process of deciding where to apply and then actually choosing a college to attend.

On this February morning, Lucy has signed up for a session in the Proteus™ lab, a pretty snappy computing and communications resource that her school developed in partnership with some other independent schools. The lab coordinator, Ms. Levine, asks Lucy if she needs any help. Because she has been using the system all year, Lucy feels confident and declines Ms. Levine's offer.

Like the other students in her school, Lucy has been working throughout the year on a "Holocaust as Living History" project, one of several projects her school has developed and run on the Proteus™ system. Like the "River Ecology" and "Electric Car" projects, the "Holocaust as Living History" project is interdisciplinary and open-ended; there are no tests to pass or exams to take. Instead, Lucy is faced with an even more difficult dilemma—how to demonstrate what she has learned about the Holocaust. That's why she signed up to work in the lab this morning.

Lucy begins by opening her digital portfolio and reviewing the work products she has produced since she first began investigating this topic: she finds the transcript of an

interview she conducted with a Holocaust survivor in Hartford using the Proteus™ videoconferencing equipment; she finds research notes she took while using the school's library and various Web-sites; she finds an article about tolerance she published in the school newspaper; she finds her copy of a multi-media presentation she did in collaboration with two other students (Mike is a senior at a school on Cape Cod, and Emily is a junior at a school in northern Vermont) using the Proteus™ system to support and store their work, and she finds a copy of a paper she wrote last term for Mr. Treska's history class.

By clicking on another button, Lucy accesses the feedback she has received on each of the pieces: her teachers, peers, fellow collaborators, parents, teachers from other schools, and outside parties have all given her feedback at one time or another. Of particular interest to her this morning is an email message she received three days ago from Megan, a college student who had read a draft of the short article on tolerance Lucy published in the school newspaper. Megan is a sophomore at a mid-western liberal arts college. She and three other undergraduates at her college serve as mentors to the younger students using the Proteus™ system. Knowing that Lucy is interested in ways of increasing tolerance on campus, Megan had forwarded an article on a similar theme published in the college's newspaper.

In the forwarded piece, which made reference to a recent rally held in support of extending Fourteenth Amendment civil rights protection to gays and lesbians, the collegiate writer argued that sexual orientation was not analogous to race and should therefore not be afforded the same civil rights protection. In her header, Megan notes that while Lucy might not agree with the piece, it was a question she should think about. After

reviewing the article again, Lucy wonders if the writer's vaguely homophobic attitude is typical of those held on Megan's campus or if it is unusual. The more she thinks about it, the more she realizes that it matters to her how people in a school community treat each other's differences. It matters more than she had thought. She wants to get back to Megan anyway to see if she had any advice about how Lucy might present her learning, so she decides to tack on a question or two about the article Megan had sent to her.

While she drafting her message to Megan, Lucy realizes that she has several questions for Megan that aren't directly related to the Holocaust project. She wonders if her academic experiences in prep school are truly similar to those she can expect to have in college. Will her professors give her tests and papers most of the time, or will they expect her to do what she is struggling to do now—present her learning in a format of her own choosing? Will she have the same opportunities to publish articles in the school newspaper or does a college newspaper have a lot more restrictions on who can publish articles? She adds these questions to her email message and asks Megan if she could suggest a time later in the week when they might schedule a videoconference.

After sending her message to Megan, Lucy draws up a rough outline of the topics she wants to address in her findings and forwards the outline to Mike and Emily, the two colleagues with whom she has been working off and on all year. She mostly wants them to check the outline to make sure that she isn't overlooking anything, but she is also hoping they might have some suggestions about how to tie everything together. She attaches a short update on her evolving romance with Kit, and reminds Emily and Mike that they hadn't provided her with much gossip lately.

As the end of the class period approaches, Lucy closes her work window and checks the digital bulletin board for any messages or calls for collaboration. A sophomore at a Connecticut school has posted a message wondering if anyone knows of a ready source of statistical data on rainfall in the Connecticut River watershed. Lucy posts the address of a Northeast Utilities web site she used last term, wishes the kid luck, and signs off. Before she goes to her next class she checks in with Ms. Levine and signs up for a half-hour Proteus™ slot on the following afternoon. By then, she hopes, she will have some new ideas about how to present her findings and maybe some of her colleagues will have gotten back to her with some suggestions she can use to expand or refine her own ideas.

Part I: The Distance Issue

I began my investigation by searching for a discussion of distance education that would help me understand what qualities are essential in building a good distance education program. I wanted to be sure that the Proteus™ architecture would have the necessary features, whatever they turned out to be.

Shale and Garrison (1990) do a good job of defining what distance education is and is not. The term is often used as a generic catch-all phrase. They offer the following definition:

"1. Distance education implies that the majority of educational communication between (among) teachers and student(s) occurs noncontiguously.

2. Distance education must involve two-way communication between (among) teacher and student(s) for the purpose of facilitating and supporting the educational process.

3. Distance education uses technology to mediate the necessary two-way communication" (Shale & Garrison 1990:25).

They go on to claim that emphasis on what makes distance education different from other more traditional educational activities serves to obscure their fundamental similarity as educational activities. The means differ, but not the ends. "In our view, an abiding resolution to the problem of conceptual ambiguity of distance education is to regard it as education—and not to hold the incidental consideration of the physical separation of teacher and student as a defining point of differentiation" (Shale & Garrison 1990:26).

What follows in their essay is a philosophical defense of this position; they rely heavily on Dewey as they do so. They begin by summarizing the opposing position, those accustomed to "Regarding distance education as an industrialized form of education naturally and easily leads to a regard for education as a commodity to be "packaged" and distributed (and consumed by a learner" (Shale & Garrison 1990:26). They next extend the logic of the opposing position to its conclusion. If education can be "packaged" like corn chips or salsa, then any commodified cultural product would "count" as an educational experience. "Since any experience has the potential to be a learning situation, the unqualified idea of a learning situation is so general as to be of little use to an educational institution. Education could potentially be anything ranging from reading a book to watching a television program, to walking down the street, to taking a course, and so on" (Shale & Garrison 1990:27).

In refutation of the view of education as a consumable commodity and the accompanying fuzziness about what ought rightly be called an educational experience, Shale and Garrison begin with Dewey:

> To understand what is wrong in a deeper sense, we have to look at the philosophical underpinnings of the world view that would separate subject matter of instruction from the method of instruction. . .Dewey goes on to warn us away from this point of view, pointing out "…that thinking is the method of an educative experience. The essentials of method are therefore identical with the essentials of reflection." One conclusion we can draw from Dewey's position is that any particular rendering of a knowledge package is only one of an indeterminate number of possibilities…*Packaged knowledge as objective knowledge is illusory*" (Shale & Garrison 1990:28, emphasis added).

Midway through their essay, it is clear that Shale and Garrison want to do away with the notion that consumption of correspondence course materials constitutes an *education*. Learning is undoubtedly taking place as the student reads the material, but education is not

because the student is not forced/challenged/invited/encouraged to *think* about what he or she has read.

By tearing down the equivalence of packaged knowledge/objective knowledge, and subsequently merging process and product, Shale and Garrison are now ready to make their central claim regarding what ought to constitute distance education. "We need recourse to "dialogical communities" because…the attempt to resolve differences due to different interpretations of knowledge claims and from different processes from which these interpretations are derived must be undertaken by engaging in rational discourse or dialogue" (Shale & Garrison 1990:29). Note the shift from "product" to "process" here. In collaboration with the teacher and fellow students, each individual must bring his or her own understandings to the table and engage the others in dialogue about those understandings. Instead of watching a video-taped lecture or reading a textbook then taking a pre-packaged test, "The student must validate this emerging knowledge through collaborative and sustained interaction with a teacher and other students" (Shale & Garrison 1990:30). Shale and Garrison admit that they have staked a lot on this paradigm shift. "To the extent that distance education denies the importance of the dialogic/dialectical exchange, it runs the risk of diminishing the educational experience or even invalidating it" (Shale & Garrison 1990:31).

I think Shale and Garrison make a solid case for the essential kinship of distance education programs with other educational programs. By defining what is meant by education and asserting the centrality of communities in the educational process, they are able to shove aside those "educational products" that commodify knowledge or "package" it for consumption by (essentially) passive learners. Having laid a philosophical

foundation for their claims about education, Shale and Garrison are able to engage the question of technology in a way that makes clear how and why technology is not an end in itself. "While considerable attention has been given to the use of technological media, less attention has been paid to the nature of the communication process and the role of technologies in supporting it" (Shale & Garrison 1990:31).

Shale and Garrison view technology as a useful tool in solving the communication problem posed by distance. They explain clearly that technology does not, in and of itself, further the quality of communication, it merely makes it possible. "A message in either direction will be referred to as feedback if it goes beyond simply confirming that the message has been received…Good feedback must be explanatory rather than judgmental" (Shale & Garrison 1990:32). Technology will not help the participants distinguish between good feedback and bad; a computer will convey both kinds indiscriminately. Too often, they argue, technology is viewed as a way of delivering information and not, as is essential to an educational enterprise, as a way to support a dialogical community. They urge flexibility in designing a system that needs to do both things. "The "negotiation of meaning" required to close the communication loop is an activity separate from the transmission of information and frequently is supported by a medium different from that used to distribute the content" (Shale & Garrison 1990:36). In the end, they are forthright about the most important technological question: "The challenge, then, is how to use technology to support the two-way communication between teacher and learner" (Shale & Garrison 1990:37).

Key Ideas

- Deweyian education happens in "dialogical communities" where students interact with and engage others in the process of constructing their understandings
- Technology can and should support, even over distances, the processes of collaboration and sustained interaction necessary for education

Part II: College Students as Mentors—the Study Service Tradition

Background: Since the 1970's, "mentoring has received increasing attention in at least three fields: education, management, and psychology" (Jacobi 1991:506). Many published programs and studies about mentoring in education use the term "mentor" interchangeably with the term "tutor." For example, "In modern usage, student tutoring and mentoring involve students from colleges and universities…helping pupils in local schools…on a sustained and systematic basis…under the direction and supervision of teachers" (Goodlad 1995:2). Colleges and universities that have tutoring or mentoring programs for high school students generally see their involvement as a kind of community service that might better be called "study service." For the college student, study service combines the fields of main academic study, personal knowledge, work, and community service. Study service offers students the opportunity for "commitment, initiatitive, cooperation, development of communication skills, knowledge of the organization of knowledge, responsibility to a definable client, direct contact with an ultimate beneficiary, concentration on work that could not otherwise be done" (Goodlad 1995:4-5).

Study service programs often focus their efforts on a disadvantaged local population. "In North America, most tutors are white, female, socio-economically advantaged and receive payment or course credit, tutoring equally in elementary and secondary schools. Tutees are mostly ethnic minority and socio-economically disadvantaged…" (Topping & Hill 1995:28). The explicit and obvious goal of study service programs is to improve the academic performance of tutees. There is plenty of

evidence to support the intuitive position that tutoring makes a positive difference in tutee performance. In a 1989 study in which Memphis State teacher trainees served as tutors using an electronic bulletin board system, "The findings indicated that the performance of participant tutees was superior to that of a control group on standardized achievement tests in reading and math, as well as in some aspects of writing. Girls used the system more than boys" (Topping & Hill 1995:25). Levin, et al (1987) found cross-age peer tutoring to be the most cost effective of four educational interventions examined, while "the adult tutoring model is associated with one of the largest effect sizes, .67 (of a standard deviation) for mathematics and .38 for reading" (Levin 1987: 69).

There are usually subordinate goals of study service programs, sometimes explicitly stated, sometimes not. For example, *tutor* learning is often cited as a subordinate goal or source of motivation. "The student tutors can make cognitive gains in relation to the tutored subject, such as developing their understanding of and confidence in the subject by applying their knowledge in practical contexts. Student tutoring also gives them the opportunity to develop many of the professional "transferable" skills increasingly in demand by employers, such as communication, interpersonal and organizational skills" (Hill & Topping 1995:136). And "Tutors repeatedly mentioned that they enjoyed the company of children and explaining science to a younger audience…Students considered almost unanimously that they would gain "communication skills" by tutoring" (McIvor 1995:56).

The Aspiration Analogy: Of particular interest to me is the difficulty of measuring success in achieving one of these common subordinate goals—raising tutee aspirations. On the one hand, "One rationale for student tutoring is to raise school pupils' aspirations and motivation to continue their education at a higher level through the positive role model provided by the student tutors" (Hill & Topping 1995:136), while on the other hand, "It is relatively straightforward to show how tutoring offers cognitive and transferable skill gains for tutors; it is, however, proving difficult to demonstrate one of the most hoped-for outcomes of tutoring—an increase in the aspirations of those who are tutored" (Goodlad 1995:10).

I am interested in the question of tutee aspirations because one of the goals for my mentoring program, which admittedly involves a different population than the disadvantaged student populations in most of these studies, is for students to learn about collegiate life and the expectations that go along with it while collaborating with their undergraduate mentors. In both cases there is a subordinate goal to be reached *through induction* while the student is engaged in the program's primary learning activities. I recognize at the outset that "In a situation where there are already high levels of aspiration towards continuing in education…it is unlikely that any significant changes in aspirations which can be demonstrably attributed to the effect of student tutoring could be found. This is not to say that student tutoring will not have a bearing on the aspirations of individual pupils" (Campbell 1995:163). At the same time, "90% of programs reported they were successful in providing role models, 82% reported success in providing exposure to college

and university" (Topping & Hill 1995:23), which suggests that role modeling and exposure to college are necessary but not sufficient conditions for improving tutee aspirations.

Age, social class, gender and program structure all seem to play a role in the success or failure of tutoring/mentoring programs to raise tutee aspirations for higher education. Tutoring programs that involve elementary age students, for example, seem to have no measurable effect on tutees post-secondary aspirations. "Another point to consider here is the relevance of the tutor's role in raising school children's aspirations for further and higher education when the student is tutoring in a primary school (almost 50% of the students in this study tutored in a primary or nursery school). It is unlikely that children of primary school age (5-11 years old) will have considered or be interested in thinking about 'life after school'" (Hill & Topping1995:151). Citing another study published in 1993, "68% of the respondents (tutors) felt they had not sufficient time to talk to pupils about life in higher education. Unsurprisingly, 75% of tutees reported they had learned nothing about life in higher education. Presumably their aspirations were therefore unlikely to have changed" (Topping & Hill 1995:17).

It seems to make a difference if the tutor comes from the same social class and is of the same gender as the tutee. Campbell's 1994 study of approximately 1000 students in four secondary schools in Birmingham, U.K., used control and experimental groups, but not random assignment to groups. Tutoring took place in geography, science, and modern languages. Campbell distributed pre-tutoring and post-tutoring surveys and conducted interviews with school staff. He found that

> Important gender issues emerged from this study. In the vast majority of cases, female pupils were better informed with regard to further and higher education and more likely to aspire in these directions. Male pupils on the other hand were more likely than females to aspire toward jobs at 17 and

> 21. The typical student tutor has been found by Hill & Topping (1995) to be 'female, white, (and) middle class'. The implication is that tutoring schemes need to try to involve more male and working-class students, if the young people involved are to be successful role models for pupils, particularly young males. (Campbell 1995:165)

The effect for gender identified by these researchers seems not to be a function of age. In their study of undergraduate/professorial mentoring relationships (N=723) at five New England liberal arts colleges, Erkut and Mokros found that "College students have no difficulty identifying a role model who has demonstrated the kinds of commitments, skills, and qualities they see as important for themselves" (Erkut & Mokros 1984:411). Noting that female students chose female role models in direct proportion to the percentage of females on the faculty while men tended to avoid female models, they concluded that students were looking for fundamentally different things in a mentor. "Female students who choose female models look for the exemplification of a career woman's total lifestyle…Men, on the other hand, avoid women as role models because they are interested in high status, powerful male professors who can help them along in their education or career. Female students, especially those choosing female models, look to their models for information that it is possible to combine a rewarding professional life and family life" (Erkut & Mokros 1984:415-416).

So, when it comes to a program goal like increased tutee aspiration, the study service literature is inconclusive. It does, however, suggest that a student's environment—at school, at home, in the community—probably has a larger effect on a student's aspirations toward higher education than would regular contact with a college student. John Potter reinforces the importance of the student's environment and the notion of saliency in role modeling. "It is hard to show concrete evidence that tutoring on its own

makes a significant difference to pupils' aspirations. Much depends on two factors: (I) the saliency of the role model—successful and highly intelligent middle-class undergraduates do not necessarily encourage young people from and educationally deprived inner-city housing estate to aspire to higher education, and (ii) the extent to which a school offers a coherent range of opportunities for its pupils to think seriously about further and higher education" (Potter 1995:128).

Students at Charlemont and the other independent schools in the Small Schools Collaborative are already planning to attend college, so the efficacy of mentoring as a means of increasing their college aspirations is something of a moot point. I do think there is a role for mentors to play, though, and it is precisely the one described in this summary of Astin's work (1977,1984): "the extent to which a student is involved in the educational process is a good predictor of graduation and academic achievement…mentoring can be viewed as a vehicle for promoting involvement in learning. The mentor would encourage and motivate the student protégé to deepen his or her involvement in learning and would provide opportunities for particular kinds of involvement" (Jacobi 1991:523). Figuring out how college students serving as mentors might encourage their proteges to *deepen* their involvement in learning is the task at hand in the next section.

Key Ideas

- Age, social class, and gender of mentor make a difference in some cases
- It is hard to show that tutoring/mentoring programs on their own significantly raise tutee/protégé aspirations to attend college
- Mentoring can promote protégé's increased involvement in learning

Part III: Mentoring on Proteus™

Definitions: It is probably time to make some distinctions between tutoring and mentoring. Here is one practitioner's version of how tutoring and mentoring differ:

	TUTORING	MENTORING
FOCUS	Academic learning	Life skills
LOCATION	Usually in classroom	Often outside classroom
MODE	1 to several	1 to 1
DURATION	A few weeks	Several months or years

(adapted from Goodlad 1995:2)

Building on these distinctions, "Mentoring as a function of educational institutions can be defined as a one-to-one learning relationship between an older person and a younger person that is based on modeling behavior and extended dialogue between them" (Jacobi 1991:507). Like Goodlad, Jacobi holds that something larger and broader than academic learning is at stake in a mentoring relationship. Jacobi goes on to identify five components of mentoring about which there is strong agreement in the literature:

1) "mentoring relationships are *helping relationships usually focused on achievement*...whereas a traditional supervisor or teacher helps the employee or student to perform specific tasks correctly...the mentor typically helps the protégé achieve longer term, broader goals.
2) "mentoring includes any or all of three broad components: (a) emotional and psychological *support*, (b) direct assistance with career and professional *development*, (c) *role modeling*.
3) "mentoring relationships are *reciprocal relationships*."

4) "mentoring relationships are *personal*."
5) "relative to their protégés, mentors show greater experience, influence, and achievement within a particular organization or environment. " (Jacobi 1991:513, emphasis added)

The importance of the relationship between mentor and protégé, as well as the emphasis on mutuality and reciprocity within the relationship are emphasized by an adult mentor who worked with her protégé via email: "It is important to set up the ground rules because it (mentoring) involves a mutual sense of confidentiality and trust. I think it is also important to establish a 'use-by' date. We need to understand where we are going and agree on how it will work. Of course the protégé contributes to this setting-up of the ground rules and we discuss issues such as where we should draw the line on personal matters, etc." (Clulow 1995:93).

All of these definitions or attempts to describe what is meant by mentoring proceed from an assumption that the phenomenon is developed within and contained by a particular *relationship*. Like all relationships, a mentoring relationship will go through phases, even though those phases are not always distinct. Kathy Kram describes four predictable phases: an initiation phase, a cultivation phase, a separation phase and a redefinition phase" (Clulow 1995:89). Kram's work is also important for introducing a *functional definition* of mentoring, suggesting that "aspects of a mentoring relationship can be detected in a wide range of personal interactions…The relationship constellation is the range of relationships with superiors, peers, subordinates, and (outside work) family and friends that support an individual's development at any particular time…It reflects the fact that…*mentoring functions are embodied in several relationships* rather than just one" (Clulow 1995:89, emphasis added).

For example, when Kram listed the qualities or functions usually associated with a mentoring relationship and asked individuals participating in a mentoring program associated with a college course where in their lives those functions were served, "Kram (1985) found that 'spouses' were generally viewed as key supporters, providing critical psychosocial functions. Seven of the 12 students interviewed (and one of the two mentors) clearly indicated their 'partner' as contributing to their development in a mentoring context in relation to the course. Such support, which is highly desirable, makes any attempt to find strict cause-and-effect relationships in mentoring impossible" (Clulow 1995:94). Another Kram study also found "Peer relationships appear to have the potential to provide strong interactive communication in relation to some of the mentoring functions" (Clulow 1995:95). Specifically, Kram & Isabella (1985) found that three types of peer relationships emerged from their study.

INFORMATION PEER	**COLLEGIAL PEER**	**SPECIAL PEER**
information sharing	career strategizing	confirmation
	job-related feedback	emotional support
	friendship	personal feedback
		friendship

Understanding mentoring as a cluster of work-related and psychosocial functions rather than as a one-on-one exclusive relationship opens up a whole new set of possibilities and challenges within a collaborative work environment like Proteus™. On the one hand, "it is clear that peer relationships are able to fulfil a number of functions similar to those

provided by a mentor. As students are more likely to have access to a larger number of peers than prospective mentors, the benefits of developing a peer relationship as a student support system should be encouraged" (Clulow 1995:97). On the other hand, "Peer relationships often operate spontaneously. That is, they may not work to any formal agenda, nor attempt to achieve specific objectives. Work-related advice and support may be exchanged periodically, touched on, returned to at another time. 'Negative' feelings towards the work environment may also be shared and even promoted. This feature of peer relationships contrasts sharply with the positive goals of mentoring relationships" (Clulow 1995:96). Further articulation of how mentoring functions are distributed within a collaborative work environment should help us see the difference between a mentoring relationship and a peer relationship.

	MENTORING RELATIONSHIPS	**PEER RELATIONSHIPS**
Enhances Individual's Career Through	• Sponsorship • Coaching • Exposure & Visibility • Protection • Challenging Work Assignments	• Information Sharing • Career Strategizing • Job-Related Feedback
Psychosocial Functions	• Acceptance & Confirmation • Counseling • Role Modeling • Friendship	• Confirmation • Emotional Support • Personal Support • Friendship
Special Attribute	• Complementary	• Mutuality

(adapted from Kram & Isabella 1985:117)

The literature suggests to me that, given the open and collaborative nature of the work environment within which the mentoring is to take place, our program would be well

served by allowing peers to assume some of the functions associated with mentoring under a strict relational definition.

The Mentor as Teacher: The mentor's role as outlined in the foregoing chart bears a strong resemblance to the role played by the teacher in a Project Zero classroom, where teaching and learning are based on "Theory One." "Theory One says this: *People learn much of what they have a reasonable opportunity and motivation to learn*" (Perkins 1992:45, italics in original). Meeting these conditions constitutes a "reasonable opportunity and motivation to learn:"

> *Clear information*. Descriptions and examples of the goals, knowledge needed, and the performances expected.
> *Thoughtful practice*. Opportunities for learners to engage actively and reflectively whatever is to be learned—adding numbers, solving word problems, writing essays.
> *Informative feedback*. Clear thorough counsel to learners about their performance, helping them to proceed more effectively.
> *Strong intrinsic or extrinsic motivation*. Activities that are amply rewarded, either because they are very interesting and engaging in themselves or because they feed into other achievements that concern the learner. (Perkins 1992:45)

In terms of student/teacher interactions, didactic teaching, coaching, and Socratic teaching are the three "key incarnations" of Theory One in practice.

> If Theory One is central to these three rather different ways of teaching, what accounts for the contrasts among them? In a word, agenda. Didactic teaching serves a need that arises in instructional contexts, that of expanding learners' repertoire of knowledge. Coaching serves another need: ensuring effective practice. Socratic teaching serves yet others: helping learners to work through concepts for themselves that they might not truly grasp in any other way, as well as giving them a chance to engage in and learn about inquiry. (Perkins 1992:58)

The mentoring role described in the chart above bears the strongest resemblance to the teacher in coaching mode: "The coach applauds strengths, identifies weaknesses, points up principles, offers guiding and often inspiring imagery, and decides what kind of practice to

emphasize" (Perkins 1992:55). In a discussion of how to create a "hot cognitive economy," Perkins suggest that "Coaching and Socratic teaching can reduce the cost of complex cognition in risk and fear by supporting students in the learning process in ways that didactic instruction cannot and can increase the gain by helping students to learn more and by providing a more interesting, interactive style" (Perkins 1992:165).

Getting Started: Careful selection of mentors is the first step in insuring the success of the program. "The obstacles facing mentoring and its inherent risks are made dramatically worse by an attitude toward this enterprise that might be called 'fervor without infrastructure', unrealistic expectations about mentoring coupled with naivete about what it takes to make mentoring work." (Freedman 1995:222) In addition to encouraging matching by gender and social class, Freedman recommends that program directors screen volunteers out rather than in. Let "them know about the harder realities of mentoring from the start so that only those individuals genuinely committed would become involved" (Freedman 1995:223).

Integrating Project Zero Principles with Good Mentoring Practice: The next challenge, then, would seem to be training mentors to act as good coaches to their proteges. "Training is an essential part of preparing mentors for their job. Mentors who emphasize listening to youth early on in the relationship—and avoid the impulse to impose preconceived plans for the young person's improvement—are best able to establish trust and forge a connection" (Freedman 1995:223). Essentially, mentors must be given a

chance to learn about the values and assumptions that underlie the program and to develop the kinds of skills that will allow them to be effective given those values and assumptions.

In an article describing a successful program in which college students serve as science museum interpreters for visiting groups of younger students, the program's director outlined the elements of the training program all volunteers are required to undergo. I added the headings so that I can generalize from this specific example.

Theoretical Background

1. "Introduce the idea of a museum experience being a positive and complex learning experience."
2. "Presented the more theoretical aspects of the program: how children can learn and what influences their memories."

Coaching Behavior

3. "How, as student tutors, they may be able to influence children's agendas and expectations to maximize the benefit of a class visit to the museum."
4. "Looked at methods of presenting science to children by means of questioning children on what they see and observe through comparison, description and recording of their findings."

Reflective Practice and Evolving Development

5. "Observation of museum visitors and reflection on personal feelings as a visitor."
6. "Observe visitors and professional museum interpreters; explainers, actors and guides at work around the museum." (McIvor 1995:60-61)

As in this museum program, mentors in our program should understand the theories upon which the Proteus™ program is built, the behaviors expected of them in their role, and ways in which their own learning and development are supported by the program's infrastructure and expectations. Briefly stated, mentors would need to understand

Theories: constructivism, and the principles of Project Zero;

Behavior: how to serve as a learning coach; and

Development: how to be a reflective practitioner.

The importance of having mentors who understand the conceptual and behavioral frameworks within which their interaction with their proteges will take place is suggested by Margaret Shore's case study of tutoring and mentoring in a constructivist pre-school classroom. She uses the terms mentor and tutor merely to distinguish between levels of expertise in working with pre-school children. The pre-school program was based on Vygotsky's zone of proximal development (ZPD) cognitive development paradigm, so the tutoring work was structured as a cognitive apprenticeship model. Shore taped one-on-one tutorial interactions between adults and children, then used linguistic analysis of the transcripts to assess the kinds of questions posed, the quality of the interactions, and developed from these data a list of competencies adults would need in order to be effective tutors and role models within a constructivist paradigm. This is what she concluded:

> From this background it was decided that students as tutors would need to develop specific abstract tools in order to assist effectively the development of children's higher-order cognitive skills and problem-solving strategies through the ZPD. Seven abstract tools were identified as necessary to be introduced:
>
> - observation—a diagnostic tool to assess needs for promoting higher-order cognitive skills and problem-solving strategies
> - role modeling—a tool to demonstrate performance standards when promoting new behavior
> - contingency management—a tool to inform on the desirability of behaviour (does not promote new behaviour)
> - feedback—a tool to provide information or motivation on standard of performance (does not promote new behaviour)
> - instructing—a tool to provide information and knowledge when promoting new behaviour
> - questioning—a tool to challenge and extend existing thinking when assisting learning
> - cognitive structuring—a tool to develop conceptual frameworks when promoting new behaviours." (Shore 1995:181-182)

Shore's work suggests that an adult's effectiveness in helping children learn within a constructivist paradigm is largely a function of how well the adult has mastered the strategies of didactic teaching, coaching, and Socratic teaching described in Project Zero's Theory One. What Perkins calls "didactic teaching," for example, Shore calls "instructing." Similarly, *role modeling*, *contingency management*, and *feedback* are all subsumed in the Theory One "coaching" role, where "Socratic teaching" is principally a process of putting to use Shore's tools of "questioning" and "cognitive structuring."

Key Ideas

- Relational definition of mentoring stresses mutuality, reciprocity, confidence, and trust within a one-on-one relationship.
- Functional definition of mentoring stresses work-related and psychosocial needs that can be met by a number of people.
- Under a functional definition, peers can perform some mentoring functions.
- Teaching-as-Coaching is consistent with Project Zero learning and collaboration principles and with a functional definition of mentoring.
- Selection and initial training of mentors is a process that should be undertaken deliberately.

Summary and Conclusion

The Proteus™ architecture enables the formation of the kind of "dialogical communities" Shale and Garrison associate with effective distance learning environments. With its shared work spaces, archival and research capacities, communications tools, and multiple discussion areas, Proteus™ will provide strong infrastructure support to those learning communities as they evolve.

Research into the effectiveness of college students serving as tutors and mentors to adolescents shows mixed results when the desired outcome of the interaction goes beyond specific content or skill gain to include aspiration toward higher education. Since most independent school students using Proteus™ already aspire to college, of more interest are the ways in which mentoring can promote the protégé's increased involvement in learning.

Because the mentor network is part of the larger distributed collaborative community supported by Proteus™, it must share the same values; it must be constructivist and in keeping with the Project Zero learning and collaboration principles. While relational understandings of mentoring stress the mutuality and trust that develop within a one-on-one relationship, functional understandings of mentoring stress the ways in which work-related and psychosocial needs of individuals can be met by a number of people, including peers. The sheer breadth of collaborative opportunities and activities supported by Proteus™ suggests that a functional definition of mentoring would be the more robust of the two conceptual models.

Teaching-as-Coaching, a Project Zero principle, is consistent with a functional definition of mentoring. Undergraduates serving as mentors on Proteus™ should be

selected with care and be trained in how to serve as a learning coach. They should also get feedback on their performance and be encouraged to reflect on their own practice, much as one might do for a teacher within a more traditional classroom setting.

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